Early childhood education for sustainability: Why it matters, what it is, and how whole centre action research and systems thinking can help

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Abstract

The global financial crisis, global pandemics, global warming and peak oil are indicative of a world facing major environmental, social and economic problems. At the same time, world population continues to rise and global inequalities deepen. Children are the most vulnerable to the impacts of unsustainable living with specific harms arising because of their physical and cognitive vulnerabilities. Nevertheless, children do not have to be victims in the face of these challenges. Education, including early childhood education, has an important role to in building resilience and capabilities in children that equip them as active and informed citizens now and in the future and who are capable of contributing to healthy and sustainable ways of living.

Drawing on educational change literature, action research, education for sustainability, health promotion and systems theory, this paper outlines three strategies that can help reorient early childhood education towards sustainability. One strategy is the adoption of whole centre approaches to sustainability and education for sustainability. This means working across the whole of a centre's operations – curriculum and pedagogy, physical and social environments, its partnerships and community connections. The second strategy – applied in conjunction with the first – is the use of action research to investigate the early childhood setting and to create the desired changes. The third strategy is the adoption of systems thinking as a way of leveraging support and momentum for change so that education for sustainability goes beyond the initiatives of individual teachers and centres, and becomes a systems-wide imperative.

Key words: action research, whole centre change, sustainability, education for sustainability, children as active citizens, systems change

Introduction

The world is facing major environmental, social and economic problems. While the global financial crisis, global warming and peak oil have captured the headlines, other serious and long standing issues continue unabated. These include: water shortages and water pollution, soil loss and soil infertility, air pollution, fisheries depletion and habitat destruction. The potential for water and oil wars over diminishing reserves, environmental refugees, increases in infectious disease, such as Severe Acute Respiratory Syndrome (SARS) and Influenza A (H1N1) (swine flu), are other areas of concern indicative of a world and its population under stress.

To elaborate, since the beginning of the 20th century, energy use has increased 16-fold, industrial production has increased 40-fold, water use 9-fold, fish catch 35-fold, carbon dioxide emissions 17-fold, sulphur emissions 13-fold while deforestation & desertification continue to accelerate (McMichael, 2008). At the same time, world population has grown from an estimated 1.2 billion at the turn of the last century to approximately 6.7 billion, a 5-fold increase. The human species has added 1.7 billion new humans in just 20 years, with the greatest growth occurring in the less developed world. The current crises, however, are not simply a matter of too many people. 20% of the world's population uses 80 % of the resources, intensifying the already unequal development pathways between over-developed and under-developed nations. For many young children living in poverty, survival to their first birthday is their ultimate sustainability issue. 20% of children alive in the world today do not have clean, safe drinking water, adequate shelter, enough food, good access to health and education, and are open to injury, illness, exploitation, poverty and even to death for reasons not of their making (UNICEF, 2009, p.18)

Impact of Global warming

Nevertheless, a focus on global warming as a major sustainability issue reveals some new and disturbing patterns. For example, it is anticipated that infectious & vector-borne diseases such as dengue fever, malaria and SARS will increase as conditions warm. Areas of the globe already susceptible to these diseases can anticipate further increases while new localities will be exposed. There will be amplified health effects of extreme weather events such as heat waves, fires, floods, cyclones - that is, more deaths amongst the vulnerable from dehydration and heat stroke, and greater human and material losses from fires, floods and cyclones. Changing plant growth patterns may lead to increases in allergen levels and asthma-type conditions. There are likely to be mental health & suicide impacts from increased drought, floods and storms. During times of environmental emergencies, water and food security issues and related trauma will increase. In some counties, particularly low-lying nations, dislocation and relocation is already anticipated. (United Nations Press Centre, 2009).

Global warming & children

Bartlett argues that with respect to young children and the issue of global warming, children are less equipped to deal with deprivation and stress because of their rapid metabolisms, immature organs & nervous systems, developing cognition and limited experience (Bartlett, 2008). Children are particularly vulnerable to the distress and anxiety associated with their growing awareness of the risks of climate change (Fritze, Blashki, Burke and Wiseman, 2008). Additionally, their parents' mental distress and anxiety in response to the direct and indirect impacts of climate change may result in negative impacts on parenting. The risk of child abuse and neglect, for example, is elevated following extreme weather events such as cyclones and tornados. This multiplier effect means that young children are at amplified risk of harm due to environmental stress, both directly from their own experiences and perceptions, and indirectly through the effects on their parents and broader networks. Furthermore, exposure to the various risks is more likely to have long-term repercussions because they start earlier and go on for longer (Barlett, 2008). Moreover, these impacts are intensified by poverty.

Urbanisation

One of the key drivers of unsustainable living is urbanisation. For the first time in history, more than half the world's population lives in towns and cities. In the next two decades, most urban growth will be in the cities of the developing world. Increasingly, these cities are becoming youthful: 60 % of children in the developing world, for example, will live in urban areas by 2025 (Thomas, 2008). As McMichael (1993) states, "rapid urbanisation represents a profound transformation of human ecology – a transformation that is generally outstripping social and political responses (p. 261)". The environmental by-products of large and concentrated urban populations pose direct threats to health and to the quality of city life.

For children, urbanisation provides additional challenges. Traffic increasingly dominates most young people's outdoor experiences. Contact with animals is most likely cats, dogs, caged birds, cockroaches, rats and mice (Nabhan & Trimble, 1994). Louv (2005) refers to alienation and disconnection from nature as 'nature deficit disorder'. A parallel issue is the development of what has been referred to as the 'bubble-wrap generations' (Gill, 2007) where over-protection and risk avoidance, particularly in rich countries, are adding additional limitations on children's lives with respect to outdoor experiences.

Taken together, these issues are indicative of a world in stress. To emphasise this further, it has been calculated that each human requires 1/3 more of the Earth's living resources to supply their needs than Earth can provide (World Wide Fund for Nature [WWF], 2008). Australians (and others living in the 'over-developed world') need 3-4 more Earths to support their current standard of living – clearly, an unsustainable proposition. Children have the most to lose from current 'development' strategies that over-use the Earth's natural capital (Hawkins, Lovins & Lovins, 1999). However, they do not have to become victims in the face of present and future sustainability challenges. With support, protection

and education, young children can be resilient and positive about the state of the world and their place in shaping healthy, just and sustainable futures.

What is sustainability?

In 1987, the World Commission on Environment and Development (WCED) described sustainable development as "development that meets the needs of the present without compromising the ability of future generations to needs their needs" (1987, p.87). Unlike ideas of human development as mainly about economic growth that ignores or diminishes social and environmental dimensions - sustainability is a holistic concept that considers social, economic, political, natural dimensions. In particular, sustainability recognises that there are ecological limits to growth and that these have been overreached. While no one knows what living sustainably might look like, it is clearly recognised that it is everyone's business and that education has an important role in its achievement.

What is EfS?

Education for sustainability (EfS) has its origins in environmental education (EE). The 1977 Tbilisi Declaration is considered the first real expression of the pivotal role of EE with its call for environmentally-educated teachers to be the 'priority of priorities' (United Nations Educational Scientific and Cultural Organisation, UNESCO, 1990). Since then, practitioners have worked to understand what EE is, and how it can be effective in moving societies towards more environmentally-focused ways of living.

Since its inception, EE has been a concept in transition. It can be traced to its early manifestations as an outdoor, science-based education, to education with greater emphasis on interactions between people and environments. A still popular and useful conception of EE, developed in the 1990s, refers to education in, about and for the environment. This involves:

- Education in, through or from the environment that provides direct environmental (usually outdoor) experiences and field knowledge and skills;
- Education about the environment that focuses on understanding concepts and knowledge related to environmental processes and issues;
- Education for the environment that develops values and action skills - as well as knowledge and processes - aimed at learners making informed judgments, participating in decision making and taking action on environment-related issues.

In the 21st century, this 3-part conception has evolved into what is now referred to as education for sustainability (EfS in Australasia) or education for sustainable development (ESD, mainly in Europe). This conception takes a more global and wholistic view of issues and involves learners in active participation in real community problem-solving. The characteristics of EfS include: interdisciplinarity, democratic & inclusive social processes, active learning, critical thinking and problem solving, having a futures-orientation, forging community connections, and taking action. Essentially, though, EfS is a 'frame of mind' (Bonnett, 2002) and as Lang (2007) states, "requires a deep understanding of ourselves, our neighbours, our societal and cultural processes and how we are connected (p. 6)".

What is ECEfS?

Early childhood education for sustainability (ECEfS) is a synthesis of EfS and early childhood education (ECE), a unique field that is now rapidly emerging. Other educational sectors, for example primary and secondary schools, have a much longer history of engagement and research in environmental education/ education for sustainability. Currently, ECEfS is growing strongly in Australasia, beginning to turn from the 'patches of green' (New South Wales Environmental Protection Agency [NSW EPA], 2003, p. 1)) into a green quilt. At the same time, an international movement in ECEfS has begun with leadership provided by international early childhood professional association, OMEP (World Organisation for Early Childhood Education), and reinforced with the

release of the 2008 Guttenberg Recommendations on Education for Sustainable Development. This document states that "early childhood is a natural starting point for ESD [education for sustainable development] in order to promote educational access for all people within a process of lifelong development" (p. 7). Nevertheless, we are already half way through the United Nations Decade of Education for Sustainable (2005-2014), and much more needs to be done.

Achieving ECEFS

Drawing on research literature in educational change, action research, education for sustainability, health promotion and systems theory, three ways are proposed for the continued development of education for sustainability into early childhood education. These are:

- the adoption of whole centre approaches to sustainability and education for sustainability;
- the use of action research to investigate and bring about change in an early childhood setting;
- the acceptance of systems thinking as a way of leveraging support and momentum for change across the wider early childhood education system.

Each of these strategies is explored below.

Whole centre approaches

Recent research in EE/EfS indicates that the most likely way to bring about change in educational settings and their practices is through whole centre approaches (Henderson and Tilbury, 2004). Additionally, action research provides a methodical way for investigating and changing a setting towards greater sustainability. The following diagram illustrates a whole settings approach, adapted from the model by Young and Williams (1989) of a Health Promoting Schools, an international whole school change process focused on health topics and issues.

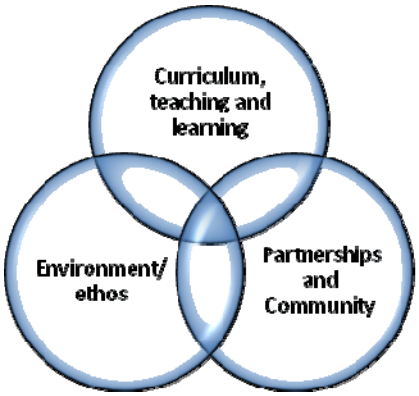


Figure 1: Wholistic model of a sustainable early childhood setting (adapted by S. Cooke, 2010 from Young & Williams, 1989)

This figure identifies the three key components within an early educational setting that must be addressed if a centre wishes to become sustainable. These are:

Curriculum and Pedagogy – This includes play-based, integrated learning and teaching activities and projects where children are active learners responding to real and relevant environmental/sustainability issues of interest to them (for possibilities, see the case study in Davis, Rowntree, Gibson, Pratt & Eglington, 2005).

Environment – This includes both physical and social environments where opportunities to interact with and learn in and from nature are readily available and utilized, and where democratic, inclusive learning, teaching and management approaches to addressing sustainability issues are paramount.

Partnerships and community – Close relationships with families and the centre's wider community and local organisations ensure that learning and teaching for sustainability is an ongoing, two-way process.

All three components must be changed for sustainability. It is not enough just for children to be engaged in gardening, for example. A Centre must also look at its management practices and approaches. Does the office minimize paper or energy usage, for example? Does the Principal or Director support and encourage staff as a professional learning community. In other words, does the centre 'practise what it teaches'?

Action research for creating change

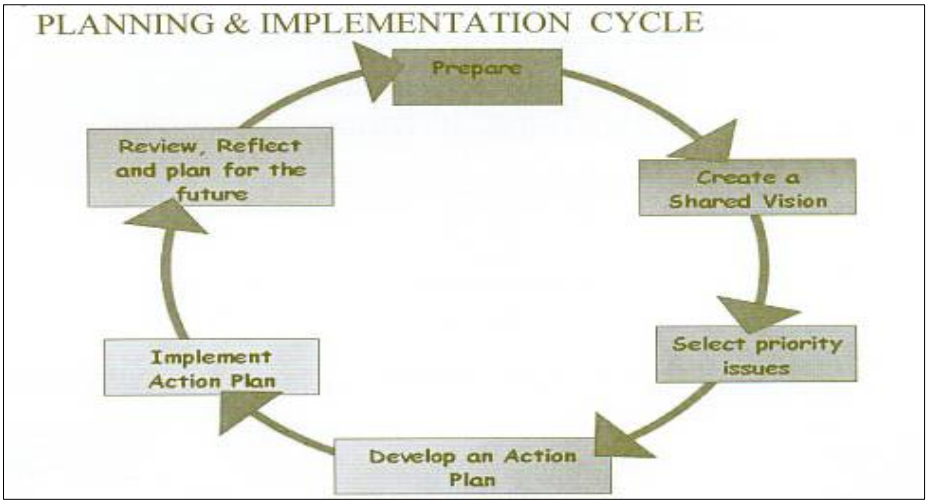
While whole centre approaches are recognised as important in creating sustainable educational settings, so is action research. Action research is acknowledged as a research method associated with emancipatory praxis, its attraction stemming from its transformative capacities and empowerment focus. As Kemmis (1994) states, it is seen as offering "possibilities for linking social research and social action, and it has made worthwhile contributions to the improvements of education, science and society" (p. 47). This attraction has also extended to environmental/ sustainability researchers and educators (Elliott, 1998; Hart, 1996).

As the name suggests, action research is a research method with the dual aims of action and research (Dick, 1993). Change is not simply a benefit of the research process; it is fundamental to it and happens throughout. It starts with reflection on current actions, including inactions, and proceeds to new actions which are, themselves, researched. What results is a continuous spiral with each cycle leading naturally and inevitably through to the next (Wadsworth, 1998). Hence, it is ongoing and constituted by a flow of interrelated events over time – it is not a linear research approach. Ownership and collaboration by participants - leading to concrete action and change – is essential. Action research it is not a top-down, expert-driven research process (Jensen, Larsen, & Walker, 1996; Wadsworth, 1998).

A 'culture of sustainability' is the outcome hoped for when an early childhood centre brings sustainability thinking and practices into all aspects of its teaching, operations, environment and relationships. This is where sustainability practices and habits, such as careful use of water and energy and democratic decision-making processes between all those involved in the centre- become part of every-day learning, routines and relationships.

Again, using Health Promoting Schools as a model, the following diagram illustrates how action research can be utilised for bringing about changes in an early childhood educational setting that seeks to 'go green'. Each step in the process is expanded upon below.

Figure 2: An action research model for creating a HPS (from Central Public Health Unit Network Qld, 2002)



Preparing for EfS

Read and research about EfS; visit schools and early childhood education sites to see what can be achieved in practice; talk to those who have already been engaged in ECEfS; talk to people in your own early childhood education community about EfS and environmental/sustainability issues in order to gain initial support.

Step 1: Create a shared vision of a sustainable centre (eco-kindergarten)

There is a range of interesting ways to engage the early childhood education community in creating a shared vision of an eco-kindergarten. One strategy is to hold a 'visioning' workshop using Guided Imagery, to help participants imagine their ideal eco-centre, without first focusing on why it is not possible. Children (and adults) can be encouraged to draw and talk about how they would like their centre/kindergarten to become. A survey is another way of gathering such data. After processing the inputs, collaboratively develop a short vision statement that captures the key ideas. Display this in public at the centre such as at the entrance, in every classroom and have it written into newsletters and other official documents as a way of acknowledging and committing to making the vision a reality.

Step 2: Select the priority issues

As part of the visioning, priority areas most in need of attention become apparent, for example, greening the playground, planting gardens, conserving water or energy. If not, conduct further interviews, focus groups, surveys or make additional observations to find out what the top issues are that need to be addressed. Give serious consideration to the ideas and issues that children propose – after all, they are the main users of the centre.

It is not practical to try to address all key issues at once. Start with one priority issue that is most likely to be successful in a reasonably short period of time. Once some initial success has been demonstrated, wider interest and commitment from your early childhood education community for tackling more complex issues is more likely.

Step 3: Develop an action plan

This plan should outline in some detail what activities and/or projects are to be developed that relate to the selected priority issues. This is where you work out who is going to do the organizing, what resources (money, people, materials) are needed, what the timelines are.

For early childhood teachers, this is the stage where curriculum activities and projects with and for children are intensively developed, related to the target topic or issue. This is also the phase where teachers and management actively plan to engage families and community members in their change processes.

Step 4: Put plans into action

This is the stage where your plans are put into action. Good leadership and wide participation is crucial at this stage, but does require earlier engagement and communication before this stage is reached. People are more likely to be involved if they already know about the project and have already had opportunities to be listened to, and to have 'had a say'.

You may find, at this point, that some of your ideas and planned actions are not feasible. Through discussions and reflections with the centre community, it is okay to change the plan! Action research accepts that this is possible – it is not a failure of your plans or your process; rather these are refinements.

Step 5: Celebrate, evaluate and plan for the future

When there are obvious successes, celebrate! Do not wait for vast and sweeping changes! Small-scale changes such as setting up a worm farm or organising a paper recycling service are worthy of celebration. It is important, however, to also pay attention to what is not going well so that you avoid making the same mistakes in the future.

An eco-kindergarten is never really achieved; it is always a work in progress. If your centre is satisfied that the first priority issue has been dealt with satisfactorily, move on to the next priority and begin new plans. Keep an eye on the first issue though – it will need constant monitoring to make sure good sustainability outcomes are maintained.

Changing the system for ECEfS: Systemic Thinking

Operating in tandem with whole Centre changes for early childhood education for sustainability is the necessity to 'scale up' change so that the whole of the early childhood education 'system' engages with EfS. Efforts to bring about educational change have traditionally focused on only a part of a system, such as an individual early childhood centre, school or individual teachers – everyone, and every centre, needs to change if the challenge of sustainability is to be addressed. These small-scale changes need to be connected into a large scale movement if an innovation such as education for sustainability is to take hold. One of the difficulties of the early childhood education system, whether nationally and internationally, is that it is highly complex and fragmented. There are many service delivery modes, multiple levels of governance, numerous stakeholders and many complex interconnections between parts of the system, its regulations and conventions, its interest groups and its hierarchies. A systemic approach seeks to explore and better understand the whole system rather than acting on a part of the system in isolation of its larger context.

Systemic thinking also focuses attention on relationships and roles (Flood, 2001, p. 115). Stakeholders from throughout the system explore the ways in which the parts of a system are interdependent, the nature of their connections, external influences, and the roles of others and oneself in the system. As a result of this inclusive process, system members develop their understandings of the larger system through appreciating patterns of activity and their many influences within the whole system. For example, teacher registration bodies, government education and welfare departments, childcare accreditation authorities and curriculum developers all impact on an early childhood setting and each has a role to play in bringing about change in the early childhood education system. A systems focus, though, goes beyond incorporating information from multiple perspectives and disciplines. Rather, it involves a deliberate method of synthesising distinct findings into a coherent whole (Gharajedaghi, 2006, p. 108). When all such sub-systems are mobilized to support the introduction of EFS into early childhood education, then the system builds capacity for change and innovation. Only then is EfS likely to be mainstreamed comprehensively and profoundly into early childhood education.

Conclusion

Creating and using networks for ECEfS is an important way to keep all parts of the system informed and actively engaged in the wider change processes. Advocacy and engagement across all parts of the system – individual centres working holistically to create cultures of sustainability through action research, as well as an activist body of early childhood education professionals working to influence the larger early childhood education system - have the potential to change the field forever. It is hoped that, by the end of the United Nations Decade of Education for Sustainable Development (UN DESD), early childhood education will be playing its full part in building healthy and sustainable lives for young children, now and into the future.

Biography

Dr Julie Davis is Senior Lecturer in the School of Early Childhood at the Queensland University of Technology, Brisbane, Australia. The focus of her teacher education work is in social, environmental, science and health education in early childhood educational contexts. Julie has undergraduate qualifications in education and environmental studies, and holds a Master degree and doctorate in environmental education. She has been an advocate for early childhood education for sustainability for

almost 20 years and is delighted that an international movement is beginning to coalesce around environmental and sustainability issues and early education.

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